Federal Energy Management Program

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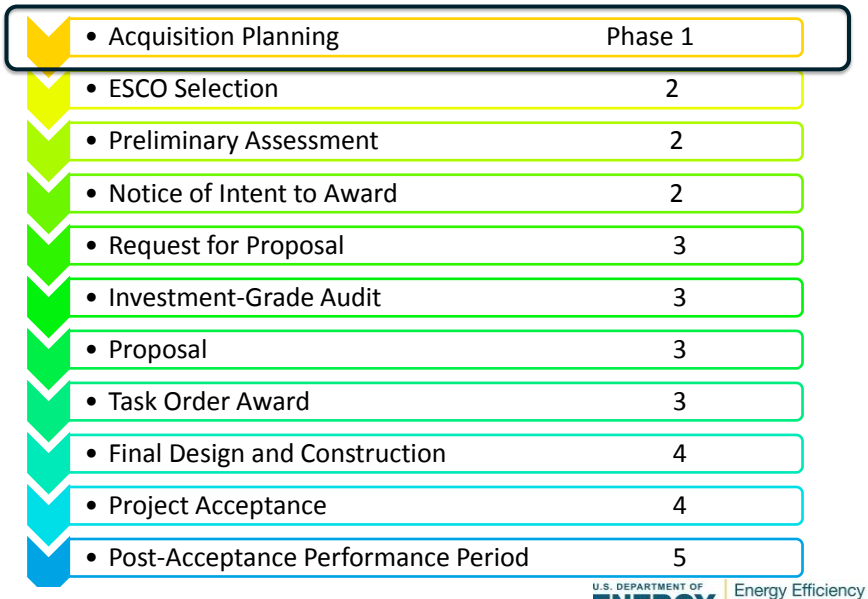
# D – Efficient Products, Advanced Technologies, and Renewables: Getting Deeper Savings from your ESPC

FEMP Federal Energy Management Program

## Overview

- Objective:
  - Achieve maximum energy savings from your ESPCs
- Steps: Agency initiates discussion w/ESCO
  - Ensure contracts meet minimum purchasing requirements
    - ENERGY STAR® and FEMP-Designated product specifications
  - Achieve deeper savings through underutilized technology
    - FEMP Technology Deployment Matrix
  - Incorporate renewables
    - Renewable energy screenings
    - Power purchase agreements

## Milestones in the ESPC Process

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## Requirements to Purchase ENERGY STAR and FEMP-Designated Products

## Agencies are required to purchase ENERGY STAR and FEMP- Designated Products

- Applies to ESPCs and all purchases of energy-consuming equipment
- Legislation and Regulations:
  - Energy Policy Act (EPAct) of 2005
  - FAR 23.203 – 204
  - FAR 52.223-15 – included in ESPC IDIQ by reference

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## Summary of Requirements

- Agencies must purchase ENERGY STAR and FEMP-designated products
  - ESCOs are aware, but agencies should ensure compliance
- Applies to all products covered by the two programs (~ 90)
- Exemptions (with written determination by agency head) only when there is no ENERGY STAR or FEMP-designated model that:
  - Meets the agency's functional requirements
  - Is life-cycle cost-effective for application

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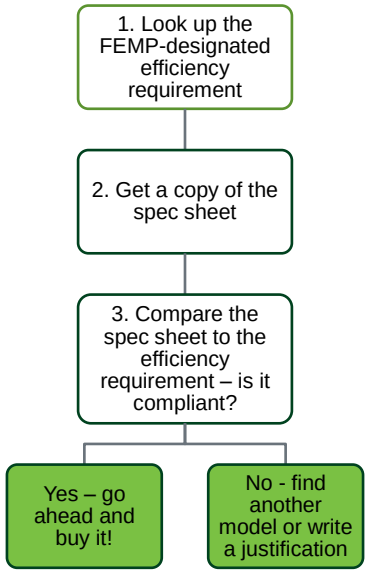
## Ensuring Compliance

- Make sure to discuss the requirements with the ESCO early in ESPC process
- Check the FEMP website to see which product types are covered
- Review spec sheets in ESCO's proposal to check whether specified models meet efficiency requirements

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## What To Do

- Look up the FEMP-designated efficiency requirement
- Get a copy of the spec sheet
- Follow the checklist

**Checklist**

a) Is it the right product type? (EX: water heater)
- Commercial?
- Gas?
- Storage, instantaneous, or hot water supply boiler?

b) Does it meet or exceed the FEMP-designated efficiency requirement?

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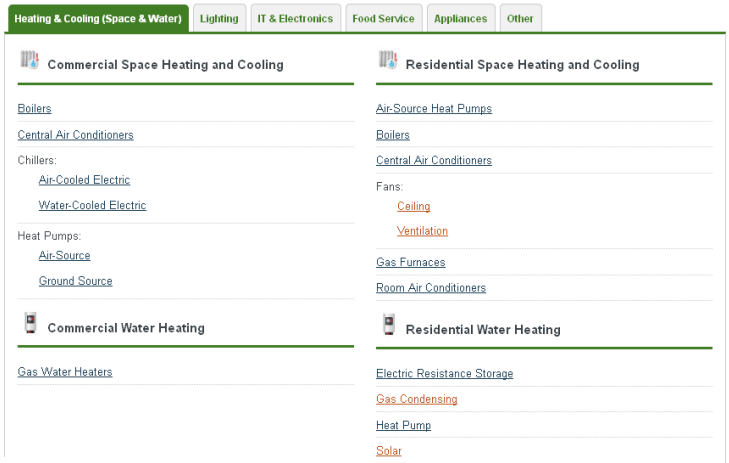
## Look up the FEMP-Designated Efficiency Requirement

- Visit www.FEMP.energy.gov/coveredproducts

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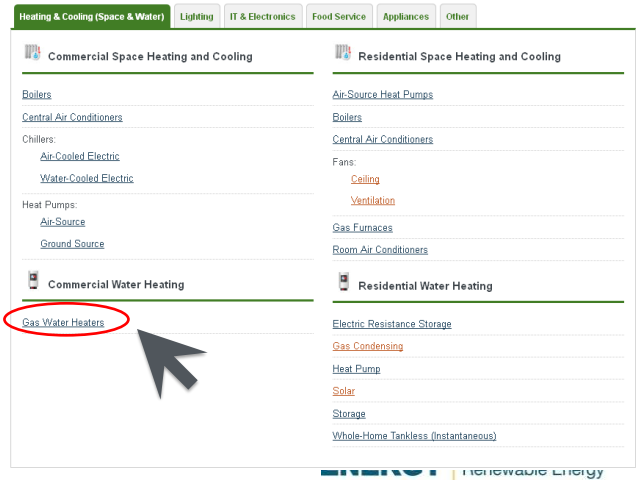
## Is the product category covered?

- Select the product type

If it appears on this website, it's covered by either FEMP or ENERGY STAR

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## Find the Efficiency Requirements Table



### FEMP Designated Product: Commercial Gas Water Heaters

**Legal Authorities**

Federal agencies are required by the National Energy Conservation Policy Act (P.L. 95-619), Executive Order 13423, and Federal Acquisition Regulations (FAR) Subpart 23.2 and 53.223 to specify and buy ENERGY STAR® qualified products or, in categories not included in the ENERGY STAR program, FEMP designated products, which are among the highest 25% of equivalent products for energy efficiency.

Information about energy-efficient commercial gas water heaters in this section includes the following:

- Performance Requirement for Federal Purchases
- Buying Energy-Efficient Commercial Gas Water Heaters
- Buyer Tips
- User Tips
- Cost-Effectiveness Example
- Cost-Effectiveness Assumptions
- Using the Cost-Effectiveness Table
- For More Information

A PDF version of *Purchasing Specifications for Commercial Gas Water Heaters* is also available.

**Performance Requirements for Federal Purchases**

| Product Type | Rate Input (Btu/h) | Thermal Efficiency[a] |
|---|---|---|
| Storage[b] | 75,000 or greater | 94% or greater |
| Instantaneous[c] | 200,000 or greater | 94% or greater |
| Hot Water Supply Boiler[d] | 300,000 to 12,500,000 | 94% or greater |

[a] Thermal efficiency is the ratio of heat transferred to water flowing through the water heater to the amount of energy consumed by the water heater as measured by the thermal efficiency test procedure contained in ANSI Z21.10.3-1998.

[b] A self-contained unit that heats and stores water within the appliance at thermostatically-controlled temperature for delivery upon demand.

[c] A water heater with an input rating of at least 4,000 British thermal unit per hour (Btu/h) of stored water.

[d] A packaged boiler with an input rating from 300,000 to 12,500,000 Btu/h (at least 4,000 Btu/h per gallon of water stored) and is intended for heating potable water.

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## Get a copy of the spec sheet

- How? Spec sheets should be included as part of the contractors proposal
- This example was downloaded from a manufacturer website and is not a product endorsement: http://www.americanwaterheaternews.com/media/lit/polaris/Polaris_Commercial_Spec_sheet.PDF


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## Compare spec sheet to FEMP-designated efficiency requirement

**FEMP Designated Product: Commercial Gas Water Heaters**

| Performance Requirements for Federal Purchases | | |
|---|---|---|
| **Product Type** | **Rate Input (Btu/h)** | **Thermal Efficiency[a]** |
| Storage[b] | 75,000 or greater | 94% or greater |
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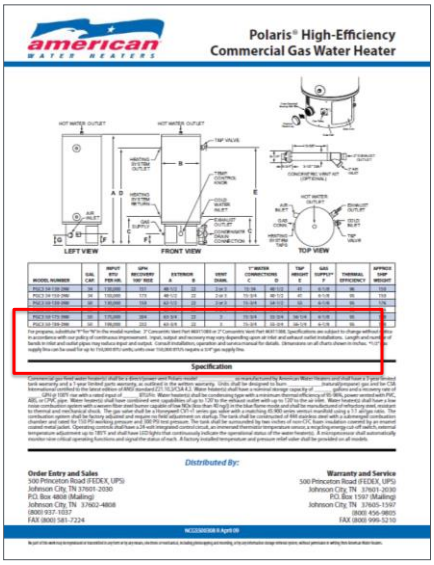


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## Achieving Deeper Savings: Advanced and Underutilized Technology

## Benefits of Including Advanced EE and RE Technologies in ESPCs

- Financing of up-front costs
- Better access to rebates and tax incentives
- Performance guarantees
- A partner (the ESCO) who is also invested in the success of the technology
- FEMP assistance and resources, including experts from DOE national labs





## FEMP Technology Deployment Web Pages

- Unbiased information about energy- and water-efficient technologies that:
  - Have a high potential for energy savings
  - Offer cost benefits
  - Are commercially available for deployment

Navigation to the Technology Deployment:
**FEMP Home » Products & Technologies » Technology Deployment » Efficient Technologies and Products for Federal Facilities**



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## Categories of Technologies

- Heating and Cooling
- Lighting
- Plug Loads:  Appliances and Electronics
- Water
- Windows and Building Envelope

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## Examples of Promising Technologies

| Technology | Category |
|---|---|
| Spectrally Enhanced Lighting | Lighting |
| Condensing Boilers | Heating & Cooling |
| **Combined Heat and Power** | **Power Generation** |
| Super T8 Lighting | Lighting |
| Low Ambient / Task Lighting | Lighting |
| Commercial Ground-source Heat Pumps | Heating & Cooling |
| High R-Value Windows | Building Envelope |
| LED / Solid State Lighting - Interior | Lighting |
| LED /  Solid State Lighting - Exterior | Lighting |

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## Use FEMP's Technology Deployment Information During ESPC Development

- As part of acquisition planning, agencies can use FEMP's Technology Deployment web pages to review technologies and opportunities
  - Ask your PF or FFS early in project development
- FEMP can schedule a meeting with the agency to review technologies
- Bringing the ESCO into the discussion can speed incorporation

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## Promising/Underutilized Technologies in ESPCs

- Outdoor LED Lighting: Army, GSA, DOE, USCG
- Induction Lighting: Army, GSA, USCG
- Roof Integrated PV: GSA
- EE Fume Hoods: DOE (LANL, ORNL, NETL), USFS
- Variable Refrigerant Volume (VRV) A/C: USCG, USAF
- LED Runway Lights: USCG, FAA
- Turbocor Chillers: USDA, GSA, USCG, NASA
- Aerosol Duct Sealing: Arch. of Capitol (U.S. House of Reps.)
- Biomass Cogen/Boilers: NETL, NREL, ORNL, BoP, DOE
- Bay Source Heat Pumps: FDA
- Cool/Green Roof: DOE, GSA, USGS, USCG
- Wind power: USFS, GSA, DOE

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## Keys to Successful Deployment

- Agency initiative and motivation is important
- Technologies may be identified by agency or ESCO
  - Agency suggestion increases likelihood of incorporation
- Projects require a mix of motivation and tolerance among project partners
  - Each partner must be motivated to incorporate the technology – or at least tolerant of it
- Perceived risks need to be identified and managed
  - For instance, how should M&V be handled for technology that's only been commercialized for 5-10 years?





## More Keys to Successful Deployment

- Demonstrations during the investment-grade audit can help reduce risks
- Use technology experts from the national labs and private sector to educate stakeholders
- Financial incentives can help offset first costs
  - e.g., many utilities offer "custom" programs that permit incentives for non-standard technologies



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## Incorporating Renewable Energy

## Renewable Energy (RE) Screenings

- Screenings offered by FEMP: First-come, first-served (and depending on available funds)
- NREL completes high-level screening and report evaluating site's potential resources for RE:
  - Wind
  - Biomass/Alt. methane fuels
  - Geothermal heat pumps
  - Solar – PV, solar thermal, solar water heating, solar vent preheat

## Obtaining a Renewable Energy Screening

- As part of acquisition planning, agency enters site data on FEMP-provided form
- Agency submits completed form to NREL
- NREL completes the screening and returns the report in about four weeks

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## Screening Shows Potential Cost Savings and Simple Payback for Renewable Technologies

| Technology | System Size | Units | Initial Cost | Annual Cost Savings | Annual Operating Cost | Simple Payback (years) |
|---|---|---|---|---|---|---|
| Photovoltaics | 500 | nameplate capacity (kW) | $2,761,250 | $63,112 | $3,616 | 46.4 |
| Solar Vent Preheat | 5,000 | area (sq feet) | $184,337 | $19,762 | $0 | 9.3 |
| Solar Water Heating | 10,000 | panel area (sq feet) | $979,227 | $67,030 | $4,896 | 15.8 |
| Daylighting | 3.5% | skylight/floor area ratio (%) | $531,494 | $18,379 | $0 | 28.9 |
| Solar Thermal | 10,000 | collector area (sq feet) | $819,060 | $48,050 | $1,939 | 17.8 |
| Wind Power | 500 | capacity (kW) | $1,532,592 | $44,620 | $3,950 | 37.7 |

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**Example Screening Report – Analysis provides detailed results for each technology**

| | |
|---|---|
| PV rating (kW) | 500 |
| PV Size ($ft^2$) | 32,024 |
| PV Initial Cost ($) | 2,805,000 |
| PV Rebate ($) | 43,750 |
| PV Production Incentive ($/year) | 0 |
| PV State Tax Credit ($) | 0 |
| PV Federal Tax Credit ($) | 0 |
| PV Initial Cost w/incentives ($) | 2,761,250 |
| Net Metering up to (kW) | 0 |
| PV Annual Energy Delivery (kWh/year) | 602,712 |
| Capacity Factor (%) | 17.9% |
| PV Annual Utility Cost Savings ($) | 63,112 |
| PV Annual O&M Cost ($/year) | 3,616 |
| PV Payback Period (years) | 46.4 |

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## Power Purchase Agreements (PPAs)

- PPAs allow agencies to fund on-site RE projects with no up-front capital costs
  - Developer installs and owns system on agency property, taking tax benefits
  - Agency purchases the generated power, paying for the system over the life of the contract
- A PPA may be included as an ECM in an ESPC project
  - Check with FEMP, an FFS, or your PF about current rules and whether a PPA is an option at your site

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## Summary: Great Reasons to Consider Advanced EE and RE Technology for Your ESPC

- Requirements for energy-efficient product procurement
- ESPCs are a proven vehicle for deployment of advanced EE and RE
  - Risk management
  - ESCOs invested in project success
- FEMP provides support every step of the way

**Agency Motivation Makes it Happen!**





## FEMP Assistance and Resources

- FEMP Web site
  energy.gov/eere/femp
- FEMP → Products & Technologies →
  - → Energy-Efficient Products
  - → Technology Deployment
  - → Renewable Energy
- FPE, PF, national lab technology experts



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**Next: Break ►**

**After Break ►**

**Phase 2 – ESCO Selection and Preliminary Assessmet**

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